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fessor of vertebrate paleontology. He will retain his position at the American Museum of Natural History.

PROFESSOR ERNST GAUPP, of Königsberg, has accepted a call to the chair of anatomy at Breslau.

DISCUSSION AND CORRESPONDENCE

AGE OF THE TUXPAM BEDS

IN SCIENCE of February 10, 1911, the writer gave a preliminary sketch of the Tertiary deposits of northeastern Mexico. In this communication the beds occurring in the vicinity of Tuxpam with their wealth of fossils, which appeared to be largely new or undescribed species, were stated to probably belong to the Miocene, and this reference has been followed in later publications both by himself and by others.

While both gasteropods and bivalves were abundant at this locality, the most characteristic fossils of these beds were the echinoderms, which included great numbers of a very large *Clypeaster*, one or more species of *Schizodus*, *Macropneustes* and *Cidaris*. None of these special forms were reported by other observers from the region to the south of Tecolutla, but the similarity of the deposits of the lower coastal area seemed to indicate their continuity, and since such fossils as had been described from these continuations were considered of Miocene or Pliocene age, it seemed probable that the Tuxpam beds were also of that age.

During the examinations made in the coastal area between Tuxpam and Tampico since this publication, numerous collections of fossils have been made and these are now being examined. We find that the Tuxpam *Clypeaster*, *Cidaris* and *Macropneustes* occur elsewhere in connection with the nummulites, cristallaria and orbitoides of the Oligocene, but where we find this association we do not find the large number of gasteropods and bivalves which are found at Tuxpam, or on the San Fernando. The shells usually accompanying these echinoderms around Tampico are simply a small pecten, a nucula, and one or two small gasteropods. In some localities imprints of

leaves are abundant in the accompanying shales.

Such an association of fossils seems to require the reference of the Tuxpam beds to the Oligocene, and if this be true, it would appear that along the western gulf shore there is no marine Miocene on the surface between Tuxpam and Galveston. E. T. DUMBLE

NITER SPOTS

TO THE EDITOR OF SCIENCE: In a recent number of SCIENCE¹ is to be found an article by Sackett and Isham relating to the formation of "niter spots" in the arid regions of the western United States. In a more recent number of the same magazine² Stewart and Peterson have given a lengthy and interesting discussion of this paper and also a description of these brown spots. These later writers have attributed the origin of these nitrates to the leaching and concentrating action of irrigating water upon the nitrates occurring in the shales and sandstones (or country rock) adjacent to and underneath the affected areas from which the soil has been derived. Their field observations were in Utah, where they describe the appearance of brown "niter spots" in certain irrigated fields.

While making some geological investigations in northwestern Nevada in 1912 it was the present writer's pleasure to make some notes relating to brown "niter spots" occurring on the playas. The observations being in strict conformity with well-known principles of commercial niter formation, the necessity of much speculation before arriving at a conclusion as to their origin was obviated. It is trusted that the few simple facts recorded at that time will serve in giving some added light on the subject in hand.

In traversing the playas brown spots were frequently noted on the surface in connection with alkali salts. When the brown mixtures of earth and salts were tested they invariably showed large amounts of nitrates. In places on the surface where the brown color was not present no nitrates were noted. Pits dug failed to show nitrates at greater depths than

¹ N. S., Vol. XLII., p. 452.

² N. S., Vol. XLIII., pp. 20-24.